SMOKY POWDER AND SPRINGFIELD RIFLES

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SMOKY POWDER AND SPRINGFIELD RIFLES.

Why they were Furnished our Volunteers.

"*Nos—nos—dicò operte—nos senatus populusque desumus.*"
—Cicero (paraphrased).

Every American schoolboy knows the famous phrase of a great American orator, "I have but one lamp by which my feet are guided, and that is the lamp of experience;" and probably a very large percentage of American youth have expatiated, from the school or college platform, upon the same thought expressed in the maxim "*Experientia docet.*" But while the value of experience has been duly impressed upon the American people of all sorts, kinds, conditions, and ages, and while all recognize that value in theory, yet any candid American citizen must admit that on not a few grave occasions, the maxim quoted above has been, in practice, either wholly ignored or most defectively applied. For example: We passed through a tremendous struggle in 1861–5. We committed the faults of undertaking grave enterprises with inadequate means; of rejecting the advice of military men upon military matters and acting in such matters, upon the opinions of civilians; of appointing lawyers and politicians to the command of armies; of expecting the performance of impossibilities; of wondering why campaigns, whose success demanded a year's hard marching and harder fighting, were not successfully finished, offhand, in a month or so; and of blaming the Executive, and particularly the War Department, for things for which we—the American people ourselves—were alone responsible.

Well, all these faults, and others beside them, were committed during the great war; and when the war was drawing to a close we saw our shortcomings and resolved upon amending our ways. Never again would we be caught with inadequate supplies of arms and inadequate means for raising, mobilizing, equipping, and supplying large armies; never again would we ignore the advice of military men on military subjects; no more should Executive action be hampered or rendered impossible by legislative inaction; and no longer would the shortcomings of the people themselves be laden upon the back of some unhappy scapegoat of a military bureau or army department. No; all would be changed. We would reform. In the Summer of 1865 it was resolved by every right-minded citizen that thereafter, if the game of war had ever to be played again, the players on our side should be well selected and should be equipped with everything that professional skill decided they ought to have.

Alas for our good intentions. They served but as so many paving stones on the downward path of humiliation and dissatisfaction. Another war broke out. It was far less momentous, far less prolonged, far less bloody, and far less destructive to us than the tremendous contest of 1861; and yet the outbreak of a war with a weak Power found us unprepared with a proper system for increasing our army, unprovided with an adequate supply of modern arms, and, above all and worst of all, unprepared to assume the blame of these deficiencies and ready, only, to fasten, blindly and ignorantly, upon some man or set of men, the censure which we ourselves should have borne. Cicero said, frankly, when the republic seemed to be in danger, "*Nos—nos dico aperte—nos consules desumus.*" We Americans should be prepared to say, with the same frankness and with greater truth, "We—we, the people—we say it openly—we, the people, are wanting."

These thoughts have been suggested by an article on "Small Arms and Ammunition," in the *Military Service Institution Journal* for January, 1899, by a field officer of the Ordnance Corps, United States Army, who has made the particular topic upon which he writes the subject of a pro-

longed, laborious, and thorough study. His views are entitled to the highest consideration and respect, and the conclusions reached by him should be most carefully weighed. It is not probable, however, that this article will reach the eyes of many readers, and its necessarily technical features must interfere with its usefulness to the average non-military man.

It, therefore, seemed desirable that some attempt should be made to express in popular language one or two of this experienced officer's thoughts and to draw some practical conclusions from them; especially in view of the popular misapprehension upon the subject as indicated by a recent editorial in a most respectable newspaper, the Philadelphia *Ledger*, of September 13th.

The subject which it is proposed briefly to discuss in this paper is the criticism which has been popularly made of the small arms used by our troops as compared with the Mauser rifle of Spain, and the comments upon the failure of our Government to supply the volunteers with the Krag-Jorgensen rifle and with smokeless powder for the Springfield rifle.

Let us consider carefully if this criticism is sound.

It is plain that the burden and heat of war fall upon the infantry; and for this reason the arms supplied this branch of the service should be the best attainable.

The capacity of a small arm to slaughter or disable the troops of the enemy must be as great as possible; and to this end flatness of trajectory, accompanied as it is by extended range, is, of course, a most important element in estimates of efficiency of rifle bullets.

It goes without saying, other things being equal, that troops armed with a rifle which will carry two miles should gain the advantage over those whose arm will carry only a fraction of that distance, *using the same elevation.*

Whatever of importance may attach to length of range, that other factor in the case, namely, *form* or degree of flatness of trajectory, must not be ignored. A bullet whose flight for, say, five hundred yards is in nearly a straight line, is much more far-reaching in effects than one whose flight over the same

distance is on an arc of great curvature. The first bullet would strike an approaching object—a horse or a man—at any point on a line five hundred yards long, drawn from the muzzle of the rifle in the direction of the object. The second bullet would fly over the head of the advancing object, and would be effective only over the remainder of the distance. In other words, the area of fire covered by a rifle which can be fired in an almost horizontal position is greater than that of a rifle fired at a great elevation.

Now, in order to insure a flat trajectory—that is, the flight of the bullet on a line as nearly horizontal as possible—it is essential that there should be great initial force. Every one knows that it requires more muscle to throw a ball a given distance on a horizontal line than to throw it the same distance at any elevation. The latter is tossing the ball—the former is throwing it. A weak boy can toss. It needs a strong boy to throw. Greater force, therefore, is required to *throw* a bullet from the bore of a rifle over a horizontal line than to *toss* it over a curve.

The problem, therefore, which presented itself in this connection, was to find such a powder charge as would carry a ball, of the desired weight and proportions, as nearly as possible on a horizontal line, and for the greatest possible distance. With a cartridge containing such powder charge, and with a small arm in which this cartridge could be safely and effectively used, a body of troops would be wielding, in battle, what would be, in effect, a mowing machine. It would cut a real swath over a large part of the space intervening between it and the advancing foe, and no opposing force could get through this area of wounds and death. The figurative expression, so common in battle descriptions, of men being "mowed down," would be no longer a figure of speech. It would be a statement of fact.

But there were difficulties in the road; and these difficulties led up to the discovery of the class of explosive compounds called "smokeless powders." The black powder charge necessary to drive a bullet with the desired velocity was entirely too bulky, that is, of disproportionate length to diameter, in the

small or modern calibres. Cartridges for these calibres made up of black powder could not be readily carried in the belt or pouch, and the powder chamber of the rifle itself had to be disproportionately long. Hence the thoughts of men engaged in trying to solve this problem were turned in the direction of obtaining the necessary propelling force on the bullet by the use of some less bulky explosive charge than that of ordinary gunpowder requisite to develop the necessary force.

This was finally accomplished, and a powder was at last invented in which useless elements were eliminated and in which a high explosive power (large gas product) in connection with a small bulk (before ignition) was obtained. But in getting at this result, another result not aimed at was produced. It was found that the new powder was converted almost, if not wholly, to gas, this being due to practically complete combustion in the rifle bore; and as a consequence the powder was nearly if not quite smokeless. The discarded elements in its composition turned out to be those to which the presence of smoke had been due. Smokelessness in powder was therefore an accidental "find"—like that of glass by the Phœnicians in their efforts to bake cakes, or like that of "crackling" when the little pig was roasted in the fire of the Chinaman's cottage.

Prior to the quest for an explosive of greater force than ordinary gunpowder, the character of small arm best calculated to compete with the modern field artillery, had been determined by ordnance experts.

In our service, for example, whilst it had been recognized that the Springfield rifle was effective at long range (two miles), and the impact energy of its bullet at this range was double that of the more modern rifle bullets, yet this result could only be attained, as has before been stated, with considerable curvature of trajectory. Again, it was generally understood that no improvement in point of velocity and range of bullet could result with the forty-five calibre rifle, by simply reducing the weight of bullet by a method of shortening up the bullet and destroying the proper ratio of weight to area of cross section.

Consequently, this arm was displaced by the Krag-Jorgensen rifle, now officially known and more properly designated as "The United States Magazine Rifle," an arm of less calibre than the Springfield, with a less weight of bullet, but having a flatness of trajectory for all ranges (more particularly at the moderate battle ranges) much greater than that of the larger calibre and more weighty bullet of the Springfield rifle.

This Magazine Rifle had been recommended by a board of army officers and approved by the authorities of the War Department as far back as 1892. There being at that time a large supply of Springfield rifles on hand, the conclusion reached by the War Department officials was that the manufacture of Springfield rifles should cease; that Congress should be asked to make the necessary appropriations to cover the manufacture of the new magazine gun to a sufficient extent *not only to arm the regular infantry, but to accumulate a sufficiency of these arms to supply any large increase in force demanded by war;* and that meanwhile, the reserved Springfield rifles should be supplied from time to time to State militia, when needed, for the purpose of drill or for use in suppressing riots and aiding civil authorities in the maintenance of peace. The appropriations made by Congress were sufficient—and no more—for a period of several years to gradually equip our small regular army (twenty-five thousand men) with the new weapons; and there the appropriations stopped. The attention of Congress was called again and again to the necessity for further appropriations. Further appropriations were asked for. The requests were not heeded. The appropriations were not made. The people of the United States, acting through their chosen representatives in Congress, disregarded the professional warning, ignored the professional request, and took chances as to getting out of the scrape of being caught with an insufficient supply of small arms as best they might when an emergency should arise. The emergency *did* arise—we *did* get out of the scrape—but the Executive and the army were severely criticised for having put us in such a predicament. The question is, to whom was the trouble due? Is it chargeable to the

Executive and the army, or the representatives of the people in Congress assembled? The answer may be inferred from what has been already said. It will be explicitly stated a few lines further on.

From the above *résumé* of facts some things are plain:—

First.—To maintain the efficiency of the infantry, improvements in small arms and their ammunition were necessary. These improvements were made through the Ordnance Department as far back as 1892; and the necessity for having on hand a sufficient supply of these munitions of war was pointed out through the same agency.

Second.—The improvements in small arms consisted or resulted in the production of a rifle of smaller calibre, throwing a lighter bullet, having a slightly greater extreme range than the old rifle, but with less force at the corresponding point of impact, although possessing the advantage of *much greater* flatness of trajectory for the intermediate and ordinary fighting ranges. The small arm thus produced was more effective, in the sense of being more searching, than the Springfield rifle, since, owing to its flat trajectory, it covered a much larger area of destruction of an opposing force, though this advantage was qualified to a degree as yet not fully determined, by its less certain maiming or destructive effect on animate subjects.

Third.—In the effort to attain the desired result, *smokelessness* in powder was accidentally developed. Its production had not been by design, and the desirability even of this property (smokelessness) *at the time* was questioned by high military authority.

With these conclusions before us, let us test the correctness and fairness of certain criticisms which have been made in the press and elsewhere upon some features in the conduct of the late war.

It has been frequently said that the military branch of the Executive Department of the Government was gravely at fault, inasmuch as there was at the outset of the conflict with Spain an insufficient supply of the new Magazine Rifle. It is beyond dispute that this deficiency was not due to any neglect on the part of the Executive. It is chargeable solely upon

the legislative branch of the Government. Congress *alone* is responsible; for it was owing solely to the failure of Congress to make the requisite appropriations asked for, time and time again, by the Ordnance Department, that the scantiness in the supply of the new rifle occurred. The fault, therefore, lies, not with the army, but with the representatives of the people; and the people should blame themselves—or rather their representatives or legislative agents—not their executive agents, who saw the mischief, pointed out the remedy, but had no power to supply it. In fact, there would seem to be no doubt that the interest of the few in certain American inventions effectually defeated the wishes of the many in the matter of appropriations for the so-called "foreign arm." This reference brings us to a fine point of distinction; and it is but just in this connection (although parenthetically) to repudiate the assertion that the present service weapon is one of distinctly foreign origin. Let an extract from the ordnance officer's article be quoted:—

"Mr. James Lee, an American inventor, has the credit of having presented to the statutory magazine board of 1878 a magazine rifle differing radically from all other rifles of that class. In lieu of the tube underlying the barrel or encased in the stock or butt and carrying a column of cartridges, he proposed (and for the first time this was proposed) a magazine, either fixed or detachable, placed under the receiver and in front of the guard, the rear portion of the receiver being cut away in order that the cartridges should enter from below. The latter were led by springs at the bottom of the magazine, retaining their parallelism with the bolt, when they were forced by the bolt into the rifle chamber. Each magazine carried five cartridges. If required to be detachable, they could be cheaply made of sheet metal, to be thrown away after the cartridges were fired.

"In this we recognize the principle of construction at present embodied in many of the most notable foreign small arms, and not only has our American inventor's name been omitted in the designation of arms of this type, but

they come back to us under foreign titles such as 'Krag-Jorgensen,' 'Mauser,' 'Mannlicher,' &c."

For the reasons specified it would therefore appear that the most appropriate designation for our small arm is "The U. S. Magazine Rifle" and not the "Krag-Jorgensen."

To return to the main subject: It has also been said, in newspapers and from platforms, that our volunteers were put at a disadvantage because they were compelled to use an "archaic" arm—the Springfield rifle; inferior to the arm used by the Spaniards—the Mauser rifle. This criticism as to the inferiority of the arm is, in some degree, just; but not for the reasons usually given. It is usually said that the Mauser rifle *carries much further* than the Springfield. This, however, is not the case, since the extreme range of both arms is about the same, and, at the extended ranges, the Springfield possesses an advantage over the Mauser—in that its bullet strikes the object with a heavier and more effective blow. The real defect of the Springfield rifle is, that to attain a great range it must be fired at a great elevation; that this elevation requires to be constantly modified as the attacking troops approach; and that such perpetual modifications tend to inaccuracy of aim. On the other hand, the real superiority of the Mauser and of the United States Magazine Rifles consists in the flatness of the trajectory and the consequent searching effect of the fire, either upon an attacking or defending body of troops or upon artillery.

But it has been asked, in tones of indignant complaint, "If you had not enough new rifles, why could you not at least furnish the volunteers who were using the Springfield rifle with smokeless powder?" That this query has been inconsiderately proposed may appear from the following remarks quoted from the source mentioned above:—

"As to the use of smokeless powder in the Springfield .45 rifle, the fact is known that its pressures run very high in small arms, frequently exceeding 40,000 pounds per square inch in our army magazine rifle, and in the lesser calibres 50,000, 60,000, and even 70,000 pounds per square inch. It

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is only by dint of supreme effort and after years of careful and exhausive experiments that a smokeless powder has at last been found (in a qualified degree) suitable for the .45 calibre Springfield rifle, one which may not overtax a breech mechanism calculated originally to resist a pressure of not more than 24,000 pounds per square inch. An increase of the black powder charge (70 grains) now used by about 10 grains will exceed the safety limit in the Springfield, although the pressures due to the usè of black powder in this arm are moderate and uniform. We use this word 'uniform' advisedly, as it is a well-established fact that pressures due to the use of smokeless powder in small-arm rifles under certain and not very abnormal circumstances are quite variable; in fact we may say that at times they are *treacherously* inconsistent and demand an exceedingly stable and positively resisting breech block, something akin to that of the Sharp's rifle of bolt system." "This," the writer says, "may be news for the 'users of the arm' and render them less severe in their criticism of the Ordnance Department."

And if more is wanting to confirm this suspicion of "treachery" in the new explosive compounds, the information will come at the hands of the artillerists who of late have noted the destruction of one of our fine modern seacoast rifles from excessive pressures, reaching the surprising limit of 100 per cent. above normal, and this in the most startling and inexplicable manner.

Let us, then, not magnify this attribute of "smokelessness" out of all due proportion—let us even at this late hour go even a little more slowly in this matter of providing smokeless powder for smoky powder guns—"putting new wine in old bottles"—and if the safety side of the argument is the most apparent, let us not close our eyes to the danger signs.

At present there is unquestionable unanimity as to the desirability of the absence of smoke from the battlefield; but this absence of smoke is viewed by real soldiers, not so much as a safeguard for themselves as for the advantage it carries with it "in clearing the field for skillful action."

Nor, in spite of this unanimity, has the problem been by any means definitely solved. It has been argued, and with no little force, that when troops are advancing to the attack over an open country, or when they are resisting an attack in a position where they are in full view, smoke is advantageous. It conceals, measurably, their position; it prevents picking off mounted men—such as officers—by sharpshooters; it facilitates movements screened from the enemy's view; and it confuses the aim of the firing adversary. More than this; its moral effect is advantageous. Men who are shrouded in the smoke of their own fire do not notice so well the casualties which are occurring in their immediate vicinity or elsewhere, as they would if the atmosphere in which they stood were unobscured. Slaughter which is plainly visible affects the *morale* of the stoutest troops. To this cause is due, in part, the difficulty of getting troops to stand under fire which they are forbidden to return or to which they have no chance of replying. It is not only that they are, under such circumstances, receiving all the punishment and giving none in return, but that the awful consequences of a destructive fire are plainly visible, with no protecting veil of smoke to conceal their horrors.

This line of argument has been strenuously urged against smokelessness in powder, though the *other properties* of such powder were required; and the illustration has been forcibly put of a battery of artillery, whose pieces emitted no smoke, exposed to the fire of a body of infantry. Every horse, it is urged, would be disabled and every mounted officer killed or wounded in short order; and the battery would scarcely have taken position before the officers, upon whose direction its fighting capacity largely depends, would be lying on the ground or on the way to the rear.

It must be confessed that this line of argument is hard to answer; and yet, if we are to believe the testimony of the men who did the fighting at Santiago, the smoke from the muskets of our volunteers played a part in drawing and guiding Spanish fire as great as if not greater than that of the balloon which was so obligingly floated over our lines. According to numerous accounts, the position of our forces

was indicated by this smoke from our rifles, and the fire of the Spanish troops directed accordingly. Moreover, it is said that the smokeless powder of the enemy enabled them to fire without their position being detected, and that the return fire of the American troops, therefore, lost much of its effect. It has, however, been suggested that the answer to this may be found in the fact that the casualties among the regulars and Rough Riders who *were* supplied with smokeless powder were much greater in proportion than those of the volunteers who were furnished only with the smoky explosive; with the inference therefrom that even in a wooded country the absence of smoke will not avail to conceal the position and movements of troops. Possibly, the reply to this suggestion may be found in the fact that the brunt of the assault fell upon or was undertaken by the regulars and Rough Riders, and that had the volunteers been exposed to the same risks their loss, owing to the use of smoky powder, would have been even greater, in proportion, than that sustained by the regulars. This, however, is merely speculative and the writer does not feel himself capable of venturing a solution of the question. nor is it positively known that the result would have been different had the regulars been supplied with the "Springfield," using smoky powder. But the conclusion would seem to be that practical experience in the Santiago campaign sustains the claim that troops furnished with smokeless powder have the advantage over troops which are not so supplied. This conclusion, however, should, in turn, be qualified by the fact that many line officers of our army of high rank, prior to the campaign, openly and emphatically expressed their preference for the Springfield rifle, even using smoky powder; and although this opinion has not turned out to be well founded, the censure of any bureau of the War Department for failing to supply the volunteers with smokeless powder and the new rifle would appear to be, on this ground alone, entirely unwarranted. Be this as is it may, it is plain that there are weighty arguments, *pro* and *con*, on the question whether smokelessness in powder is, after all, and at all times, a medium of *safety* (in the comparative sense) on the battlefield if compared

with the smoke-producing charge. But whatever may be thought upon this subject, there can be no longer room for doubt that we are not gaining the full measure of our hopes in providing smokeless powder for the Springfield rifle, and that the shortest cut and the truest solution of a vexed problem would have been found in accepting the repeated advice of the Ordnance Department, expressed in the annual reports of the Chief of Ordnance, United States Army, since 1892, that is, "temporarily and for certain specified purposes to retain the Springfield for the National Guard, holding the magazine arms in the regular course of manufacture as a reserve supply for use by any volunteer forces called for service in the field." Had this voice been heeded we would not have passed upon the Ordnance Department that censure which has been so wholly unjust.

To come back, then—what lesson is to be learned from the experience of the Spanish War? It is simply this: When you employ professional men to do professional work, give them what they ask for in the way of tools and material as far as you can; and if you have confidence in their ability and honesty, act on their advice. When a lawyer hands his client a subpœna with instructions to serve it on Monday upon the witnesses therein named, but the client fails to serve it at all or serves it on Tuesday or Wednesday, he cannot blame his counsel if the cause is lost because of the absence or lateness of witnesses. When a man is threatened with a disease whose attacks may be sudden and violent, and is told by the physician whom he consults that he should have a certain medicine always in the house ready for the emergency, but fails to send to the apothecary's for the prescribed drug, it is a hard measure of justice to blame the physician if the patient, owing to a sudden attack of the malady, is subjected to exquisite pain or has a narrow escape from death. And so, if the people or their representatives are warned by their professional military advisers that such and such arms and ammunition ought to be in "stock," but choose to neglect the warning, they must assume themselves the blame for the loss of life and suffering sustained by some

of their number, and cannot transfer the burden to the shoulders of the men whose advice they have not heeded.

One who was intimately associated during the trying period of the war with the late lamented chief of the Department which it has been the writer's effort as well as pleasure to defend, says:—

"The limited appropriations which have been made from year to year for ordnance purposes left the Department with little or no surplus on hand, and when the army had to be rapidly increased, additions could not be made to the scanty stock of material stored up as rapidly as the exigencies of the service required. For seven years General Flagler played the rôle of 'Cassandra' in predicting to deaf ears the serious consequences that would ensue if greater funds were not provided; and he lived to see his predictions realized."

GEO. TUCKER BISPHAM.

PHILADELPHIA, September 27th, 1899.

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